What is claimed is:

1. A system for measuring values of a parameter at multiple locations, comprising:

multiple transducers at spaced-apart multiple locations, each transducer optically coupled to receive light from a source of light, each transducer designed to reflect received light as reflected light indicative of a local value of the parameter, each transducer producing reflected light in a different spectral portion of the received light;

a sweeping comb filter coupled to receive reflected light from the transducers; and

a wavelength division multiplexer coupled to receive reflected light of multiple transducers from the comb filter;

wherein the sweeping comb filter and the wavelength division multiplexer are coupled together to receive and operate on reflected light from the transducers; and

wherein the sweeping comb filter has a wavelength separation between adjacent pass bands that is significantly less than the spectral range of the reflected light from the multiple transducers.

2. A system according to claim 1, wherein each transducer includes a grating.

3. A system according to claim 2, wherein the grating is a Fiber Bragg Grating.

4. A system according to claim 1, wherein each transducer is structured to produce reflected light having an optical wavelength indicative of a local value of the parameter.

5. A system according to claim 1, wherein each transducer is structured to produce reflected light having two maxima of spectral intensity indicative of a local value of the parameter.

6. A system according to claim 1, wherein the sweeping comb filter is a Fabry-Perot interferometer.

7. A system according to claim 6, wherein the Fabry-Perot interferometer has a free spectral range approximately equal to the spectral range of the reflected light from a single transducer.

8. A system according to claim 1, wherein the wavelength division multiplexer includes multiple output channels, each output channel associated with a transducer.

9. A system according to claim 8, further comprising a processor, coupled to receive light from the output channels, for calculating parameter values.

10. A method for measuring the value of a parameter at multiple locations, the method comprising:

a) transmitting light of a predefined range of wavelengths into an optic fiber system with multiple transducers, each transducer defining a spatially modulated index of refraction and defining a wavelength that is unique within the system;

b) applying optical comb filtering to light reflected from the transducers to pass reflected light having multiple spectral portions, the spectral portions having wavelength separation that is significantly less than the spectral range of the wavelengths from the multiple transducers;

c) applying wavelength division multiplexing to the reflected light so as to separate the spectral portions; and

d) using a spectral portion to determine the value of a parameter.

11. A method according to claim 10, wherein optical comb filtering involves using a Fabry-Perot Interferometer.

12. A method according to claim 11, further comprising:

e) setting the free spectral range of the Fabry-Perot Interferometer to be approximately equal to the spectral range of a single transducer.

13. A system according to claim 1, wherein the sweeping comb filter is coupled to receive optical signals from the transducers, and is coupled to feed optical signals to the wavelength division multiplexer.

14. A system according to claim 13, further comprising a sequencing distribution switch coupled between the wavelength division multiplexer and the processor.

15. A system according to claim 1, further comprising a sequencing distribution switch, wherein the wavelength division multiplexer is coupled to receive optical signals from the transducers, and is coupled to feed optical signals to the sweeping comb filter via the sequencing distribution switch.

16. A system according to claim 1, wherein the light source is a tunable light source having an instantaneous spectrum narrower than the range of wavelengths defined by the multiple transducers.

17. A method according to claim 10, further comprising, setting the instantaneous spectrum of a tunable light source to excite a series of subsets of the multiple transducers in a plurality of steps, and analyzing the plurality of signals received from each transducer.